Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

MEMORANDUM

TO: Josephine Acevedo Esquilin, PREQB

FROM: James Roehrig, GZA
John Colbert, GZA
Charles Lindberg, GZA

CC: Roger Anderson, TRC
Jeffrey Miller, HP Inc.
Socorro Martinez, USEPA
Carmelo Vazquez Fernandez, PREQB
Manual Claudio Rodriguez, PREQB

DATE: January 12, 2018

RE: Response to Request for Information
PREPA Off Site Monitoring Wells
HP Inc. Voluntary Remediation Project
San German, Puerto Rico

In response to your December 12, 2017, email, GZA GeoEnvironmental, Inc., on behalf of HP Inc., has prepared the following memorandum regarding the off-property monitoring wells (GZ-507R, GZ-508R, GZ-509R, GZ-510R, GZ-512R, and GZ-513R) which were installed on the Puerto Rico Electrical Power Authority (PREPA) property.

RESPONSE TO PREQB's REQUEST FOR INFORMATION

Puerto Rico Environmental Quality Board (EQB) information requests are presented in italic font, followed by GZA's responses.

In order to visualize the extent of the chlorinated volatile organic compounds (cVOCs) contamination at HP Inc. Voluntary Remediation Project site at San Germán, the Puerto Rico Environmental Quality Board (EQB) requests the following information regarding the former monitoring wells (GZ-507R, GZ-508R, GZ-509R, GZ-510R, GZ-512R and GZ-513R) located in the Puerto Rico Electric Power Authority (PREPA) property:

1. *History of installation these former wells*

The off-property PREPA wells (GZ-507 series, GZ-508 series, GZ-509 series, GZ-510 series, GZ-512 series, and GZ-513 series) were installed between January 8, 2002 and February 6, 2002, as part of GZA's Phase IV - Hydrogeologic Investigation which occurred between 2000

and 2002. The Phase IV investigation was the final phase of a larger program termed the Y2K Hydrogeologic Investigation. This work was documented in a March 2003 report submitted to EQB.

A monitoring well construction permit application was submitted to the Department of Natural Resources (DNER) on September 28, 2000 for the installation of off-site monitoring wells. DNER issued permit number RO-28-09-00-PRP-70271 on November 11, 2000; this permit was subsequently extended on November 18, 2001. A well completion report was submitted to EQB on July 16, 2002 documenting the work and findings.

2. *Who required the installation (if EQB or EPA)? With what purpose (e.g., contamination extent determination/delineation)?*

Our understanding is that the PREPA wells were installed as part of HP Inc.'s voluntary Phase IV Hydrogeologic Investigation, which was approved by EQB in February 2001. The objectives of the Phase IV investigation included "evaluation of possible presence of off-site contaminant sources; finalizing the delineation of downgradient flow and containment in fill, saprolite, and bedrock; and generation of design data for the possible upgrade of the on-Site extraction system." The work was part of the continuing efforts to further characterize the extent of groundwater impacts associated with historical site usage.

At the time of the PREPA monitoring well installation, Compaq (predecessor of Hewlett-Packard and HP Inc.) negotiated an access agreement with PREPA to obtain permission for well installation and groundwater sampling. Without PREPA's approval, the off-site investigation would not have been possible. PREPA's access conditions for the monitoring wells included, among other requirements:

- Restrictions on monitoring well analyses, reporting, and data validation. The specific chemicals to be reported included:
  - Trichloroethylene
  - Vinyl chloride
  - Cis-1,2-dichloroethylene
  - Trans-1,2-dichloroethylene
  - 1,1-Dichloroethylene
  - Tetrachloroethylene
  - 1,2-Dichloroethane
  - 1,1-Dichloroethane; and,
  - Chloroform;
- Limitations on the number and locations of the monitoring wells;
- Restriction on property access; and,
- Closure of the wells after four quarterly sampling rounds, or one year, whichever occurs first.

3. *Who did the installation?*

The PREPA monitoring wells were installed by Geocim, Inc. The associated boring logs are attached to this memo for your convenience.

4. *When were installed and when were in operation? For how long?*

The wells were installed between January 9, 2002 and February 6, 2002. Quarterly groundwater sampling rounds were conducted in March, June, September, and December 2002, in accordance with the PREPA Access Agreement. After the December 2002 sampling round, the wells were decommissioned. In select wells (GZ-507R, GZ-508R, GZ-509R, GZ-510R, GZ-512R, and GZ-513R), pressure transducers were deployed during the decommissioning to allow for future collection of periodic groundwater elevation readings. To accomplish this, GZA and our subcontractor, Safety Construction, lowered two transducers into each selected well (for redundancy), backfilled the wells with filter sand to approximately one foot above the well screens, then grouted the wells up to the roadbox. The transducer wires and associated connectors were extended through the grout and left in the roadboxes to allow for future data downloads. The non-transducer wells were grouted to the surface, and the associated roadboxes were removed.

In 2016, the transducer wires and connections became corroded, making the transducers faulty and unusable (see attached Photographic Log)[1]. However, by that time, other off-property monitoring wells had been installed providing downgradient groundwater elevation and quality data.

5. *Who decided to put them off and why?*

The wells were decommissioned in September 2003 in accordance with the contractual agreement with PREPA, which stated that "Compaq will close the wells after four (4) quarterly sampling rounds, or one (1) year, whichever occurs first…".

6. *Available sampling data analysis results from these wells.*

The PREPA wells were sampled on four occasions: March, June, September, and December 2002. Refer to the attached table containing associated analytical results.

We trust that this addresses your questions. If you have any further questions, please contact John Colbert at 781-278-5892 or via email at john.colbert@gza.com or Jeff Miller (HP Inc.) at 970-898-8803 or jeffrey.s.miller@hp.com.

Attachments:

1 - Boring Logs
2 - Photographic Log
3 - Analytical Data Summary Table

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[1] The issues with the transducers were described in the Q1-Q2 2016 Semi-Annual Status Report submitted in August 2016.

Attachment 1 - Boring Logs

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-507L
Page: 1 of 1
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-15-02 / 1-16-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

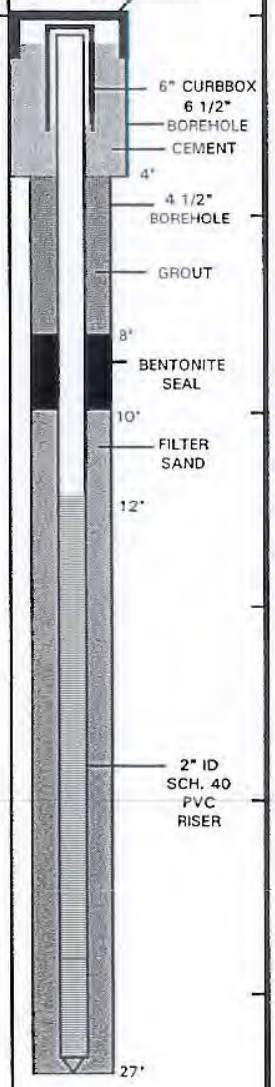
	Auger/ Casing	Sampler
Type:	Casing	N/A
O.D. / I.D.:	6"/4"	
Hammer Wt.:	300#	
Hammer Fall:	30"	
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
01-22-02	0945	20.97		

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
							No sampling performed. See boring log GZ-507R.		1, 2
							Bottom of boring at 27 feet.	27'	

Equipment Installed



REMARKS

1. Borehole advanced by 6-inch drive casing to 4 feet, and 4-inch spin casing to 27 feet.
2. Drilling mud used only to 8 feet.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-507L

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
7 PREPA Off-Site Wells

Boring No.: GZ-507R
Page: 1 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano / D. Adilman
Date Start/Finish: 1-9-02 / 1-15-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	4"/4.5"	2"/2.5"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:	2-1/2" Core Barrel	

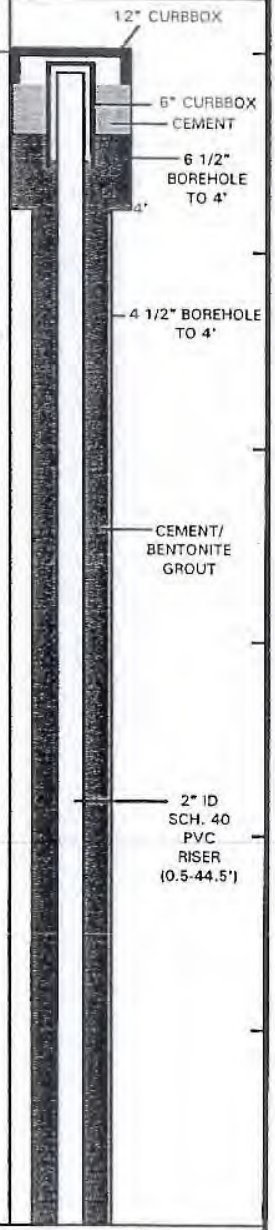
6'/4'

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
01-22-02	0945	21.0		

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		S-1	24/18	0-2	8-7	0.1	S-1: Top 2": Stiff, compact, black, asphalt with rock fragments. Dry. Highly to thoroughly weathered, light gray/olive-gray, andesite breakdown to coarse, angular, gravel-size fragments, some sand. Dry.	ASPHALT 2"	1
					31-27				2
		S-2	24/8	2-4	39-53	0.1			3
					50/4"		S-2: Same as above, throughly weathered, some hard, angular fragments, little oxidized fissures. Dry.		
5'		S-3	12/6	4-6	49-	0.3			
					59/6"		S-3: Same as above, breaks down to sand with little silt. Dry.		
		S-4	12/8	6-8	33-	0.2	S-4: Throughly weathered, compact, light olive to brownish yellow, Andesite, breaks down into medium to coarse sand. Dry.		4
					61/6"				
		S-5	12/8	8-10	31-	0.1	S-5: Same as above, little to some hard fragments.		
					64/6"				
10'		S-6	5/5	10-12	60/5"	0.0	S-6: Same as above, little hard andesite fragments, light olive to light yellowish brown.		
								FRIABLE HIGHLY WEATHERED, SEVERELY FRACTURED, ANDESITE	
		S-7	24/14	14-16	22-31	0.7	Highly weathered Andesite, light olive to brownish yellow, little open oxidized fractures.		
15'					50/5"				
								SAPROLITE & BEDROCK	
		S-8	10/8	19-21	38-	0.5	Same as above, light olive, well preserved rock grain structure.		
20'					50/4"				
		S-9	8/6	24-26	49-	0.2	Same as above, little hard fragments.		
25'					50/2"				
		S-10	12-10	29-31	21-33	0.5	Same as above, very light olive/yellowish brown.		

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a 580B organic vapor meter equipped with a photoionization detector (PID) and 10.7 eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv). PID background reading = 0.5 ppm.
2. Stopped at 1500 to wait for 300-pound hammer to drive 6-inch spin casing.
3. Use 6-inch drive casing to 4 feet; use 4-inch spin casing and drill mud to 30 feet.
4. Having trouble with swind; had to replace.

40'

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-507R
Page: 2 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano / D. Adilman
Date Start/Finish: 1-9-02 / 1-15-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

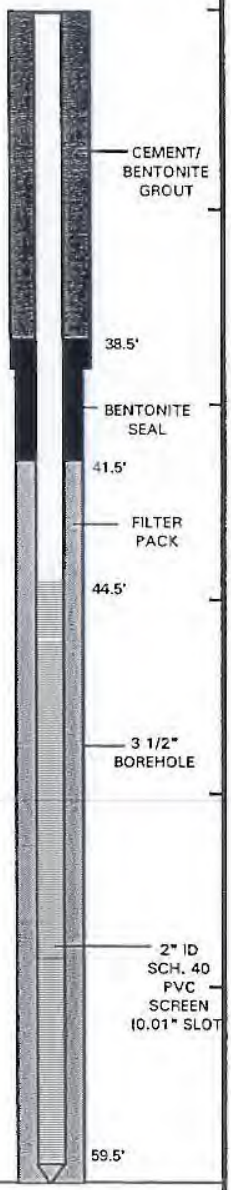
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	4"/4.5"	2"/2.5"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:	2-1/2" Core Barrel	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
01-22-02	0945	21.0		

Depth	Casing Blows	Sample Info: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
					50/2"			FRIABLE HIGHLY WEATHERED, ANDESITE	
35'		S-11	9.5/9.5	34-36	23-	0.0	Highly to thoroughly weathered, highly fractured, light olive/yellowish brown, Andesite, some wet, oxidized fractures, breaks down to sand, gravel-size fragments.		
					50/2.3"			38'	5
40'		S-12	11/8	39-41	21-	0.5	S-12: Highly fractured to moderately crushed to highly weathered, light olive Andesite, breaks down into coarse sand, gravel-size angular fragments.		
		CORE BARREL			50/5"				
		C-1	60/12	40-45	RQD=		Run 1: Hard, highly weathered to fresh, highly to severly fractured, light olive to brown/light bluish to gray, andesite, some oxidized fractures joint surfaces.	HIGHLY FRACTURED ANDESITE	
					0.0				
45'		C-2	60/15	45-50	RQD=		Highly weathered to fresh, highly fractured to crushed, light olive to brown to light bluish gray, andesite with oxidated join surface.	47'	
					0.0				
50'		C-3	60/10	50-55	RQD=		Same as above, some hydrothermal alteration with chalcopyrite on oxidated joint surfaces.		
					0.0				
55'		C-4	60/4	55-60	RQD=		Same as above, sampled as gravel-size fragments.		
					0.0				
							Bottom of boring at 60 feet.		

Equipment Installed



REMARKS

5. Started with 2.5-inch core barrel at 1538 on 1-14-02. Switched from mud to water, OD = 3.5 inches.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-508L
Page: 1 of 1
File No.: 20876.55
Check:

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-22-02 / 1-22-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

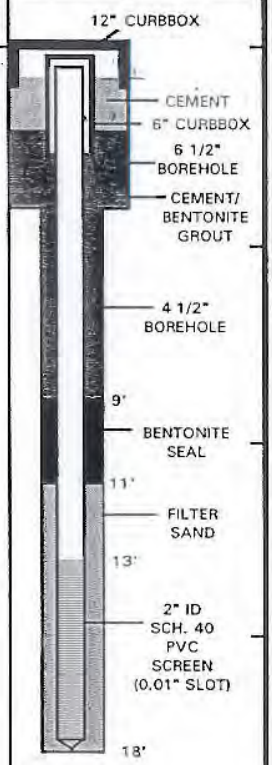
	Auger/ Casing	Sampler
Type:	Casing	N/A
O.D. / I.D.:	6"/4.5"	
Hammer Wt.:	300#	
Hammer Fall:	30"	
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
02-04-02	0950	14.88		

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
							No sampling performed. See boring log GZ-508R for stratum descriptions.		1 2
							Bottom of boring at 18 feet.	18'	

Equipment Installed



REMARKS

1. Borehole advanced by 6-inch drive casing to 4 feet and 4-inch spin casing total depth.
2. Drilling mud used to approximately 9 feet, 9 to 18 feet advanced with water.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-508L

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-508R
Page: 1 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-17-02 / 1-21-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

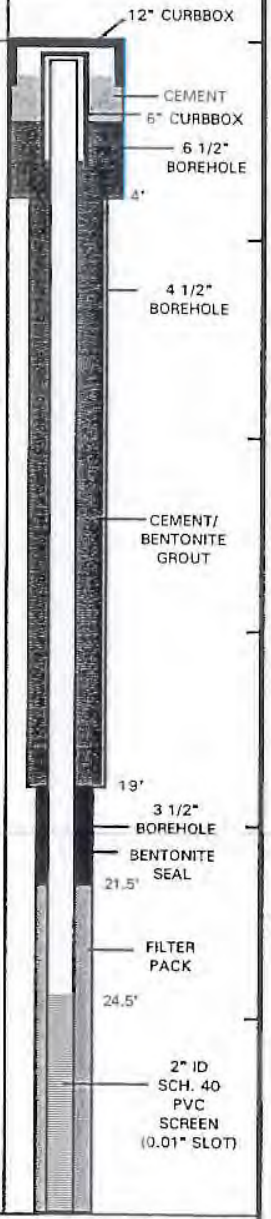
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	4"/4.5"	2"/2.5"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:	Cat Head	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
01-25-02	0910	15.65		

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		S-1	24/18	0-2	36-21	0.7	S-1: Top 4": Stiff, compact, black, asphalt with angular rock fragments. Very dense, compact, olive-gray, rock fragments in a silty sand matrix, gravel sized. Fill. Dry.	ASPHALT 4" FILL	1
					20-6				
		S-2	24/20	2-4	7-6	2.4	S-2: Medium to stiff, olive and bluish gray, CLAY, little to some rounded gravel, little sand. Slightly moist.	2' ALUVIUM	
					12-6				
5'		S-3	24/15	4-6	4-4	0.1	S-3: Top 11": Soft to medium, very dark gray, CLAY, little Silt, trace Sand, moderately organic. Lower 4": Medium to stiff, olive to yellowish brown, CLAY, trace Sand.		
					6-6				
		S-4	24/24	6-8	4-4	0.2	S-4: Top 6": Soft to medium, very dark gray, organic CLAY. Moist. Bottom 18": Medium to stiff, yellowish brown to light olive, CLAY, trace to little Sand.		
					6-9				
		S-5	24/20	8-10	3-3	0.1	S-5: Top 6": Soft to medium, yellowish brown, CLAY and dark gray, organic Clay. Bottom 14": Medium dense to stiff, yellowish brown-olive, CLAY, little Silt, trace Sand. Moist.	9.5' SAPROLITE	2
					5-6				
10'									
15'		S-6	24/14	14-16	12-41	0.8	Highly to thoroughly weathered, light olive to yellowish brown, brown, volcanic rock, breaks down to a compact gravelly CLAY with some hard rock fragments, dark gray, olive.	14.5' HIGHLY TO THOROUGHLY WEATHERED ROCK	
					40-25				
20'		S-7	11/11	19-21	18-	0.5	Same as above, some hard, bluish gray fragments.		3
		CORE BARREL			50/5"				4
		C-1	36/18	20-23	RQD=		Very hard, highly weathered to fresh, bluish gray-olive, white andesite with oxidated joint surfaces.	20' (BEDROCK) HIGHLY TO SEVERELY FRACTURED, MODERATELY TO HIGHLY WEATHERED ANDESITE.	5
					0.0				
									6
25'		C-2	60/35	23-28	RQD=		Very hard, highly to severely fractured, white, light olive, bluish gray andesite porphy, oxidated joint surfaces.		
					0.0				
		C-3	60/40	28-33	RQD=		Hard, moderately weathered, moderately to highly fractured, bluish gray, white, andesite, some oxidized, high angle fractures.		
					6.6				

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a 580B organic vapor meter equipped with a photoionization detector (PID) and 10.7 eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv). PID background reading = 0.5 ppm.
2. Tested drilling mud for VOCs with PID at 1350, total of 0.03 ppm.
3. Stopped spin casing with mud at 19 feet. Refusal of sampler at 19.5 feet.
4. Replaced drilling mud with clean water.
5. Started coring at 20 feet on 1-18-02 at 0745 with 2.5-inch core barrel.
6. Rock fragment stuck in diamond bit at 23 feet.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-508R
Page: 2 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-17-02 / 1-21-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

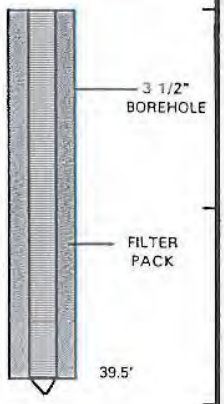
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	4"/4.5"	2"/2.5"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
01-25-02	0910	15.65		

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
35'		C-4	60/23	33-38	RQD = 0.0		Same as above, very hard andesite fragments, coarse gravel sized.	HIGHLY FRACTURED ANDESITE	7
		C-5	24/24	38-40	RQD = 58		Moderately weathered, moderately fractured to massive, light bluish gray, Andesite.		
40'							Bottom of boring at 39.5 feet.	39.5'	
45'									
50'									
55'									

Equipment Installed



REMARKS

7. Started core drilling at 33 feet at 0730 on 1-21-02.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-509U
Page: 1 of 1
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti, D. Adilman
Date Start/Finish: 1-25-02 / 1-25-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

	Auger/Casing	Sampler
Type:	Casing	NA
O.D. / I.D.:	4"/4-1/2"	
Hammer Wt.:		
Hammer Fall:		
Other:		

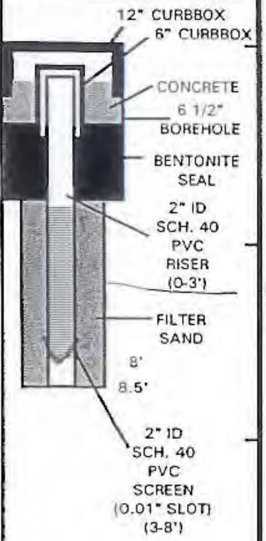
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	No.	Pen/Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
0–8.5'							Refer to Log GZ-509R for stratum descriptions.		1, 2
8.5'							Bottom of boring at 8.5 feet.	8.5'	

Depth scale: 5', 10', 15', 20', 25'

Equipment Installed



REMARKS
1. Boring advanced with 6-inch drive casing to 4 feet and 4-inch spin casing to total depth.
2. No drilling mud was used.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-509U

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-509L
Page: 1 of 1
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti, D. Adilman
Date Start/Finish: 1-23-02 / 1-24-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

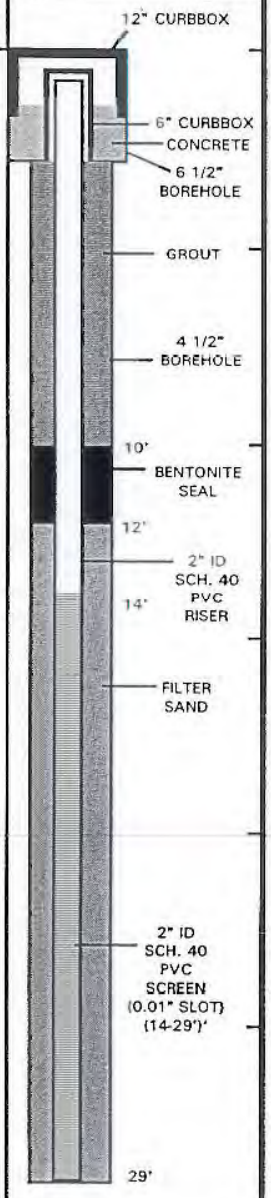
	Auger/ Casing	Sampler
Type:	Casing	NA
O.D. / I.D.:	4"/4-1/2"	
Hammer Wt.:		
Hammer Fall:		
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
							No sampling performed. Refer to boring log GZ-509R for stratum descriptions.		1 2
							Bottom of boring at 29 feet.	29'	

Equipment Installed



REMARKS

1. Borehole advanced by 6-inch drive casing to 4 feet and 4-inch spin casing to total depth.
2. Drilling mud used to approximately 10 feet; 10 feet to total depth, advanced with clean water.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-509L

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-509R
Page: 1 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti, D. Adilman
Date Start/Finish: 1-17-02 / 1-25-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

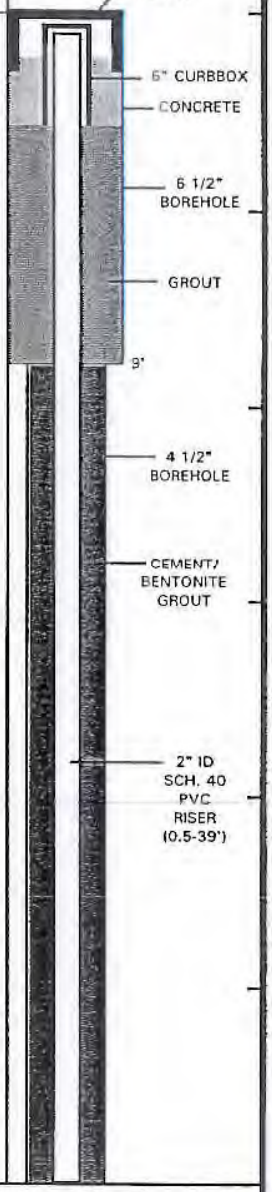
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	6"/4"	2"/2-1/2"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Info: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		S-1	24/12	0-2	25-39	ND	S-1: Top 4": Asphalt. Very dense, brown, fine to medium SAND and Gravel fill. Bottom 4": Gray, fine to medium SAND and Gravel. Fill.	ASPHALT 4" GRANULAR FILL	1
					10-11				2
		S-2	24/10	2-4	6-8	ND	S-2: Top 4": Medium dense, gray, fine to medium SAND and Gravel. Bottom: Stiff, yellow-brown, CLAY and SILT, some coarse Sand and Gravel (dry alluvium).	2.3' ALLUVIUM	
					7-7				
5'		S-3	24/20	4-6	3-4	1.5	S-3: Stiff, black, Organic CLAY and Silt (alluvium).	4'	3
					6-7			ORGANIC ALLUVIUM	
		S-4	24/24	6-8	2-4	0.3	S-4: Stiff, black, CLAY and SILT (organic). Bottom 6": CLAY & SILT, trace fine Sand (mottled).		
					4-6			8.5'	4
		S-5	24/24	8-10	2-2	ND	S-5: Top 9": Medium stiff, black, CLAY & SILT (organics). Bottom 15": Stiff, yellow-brown, Silty CLAY, trace fine Sand, dark gray-black mottles (alluvium).	ALLUVIUM TRANSITION	
					4-5				
10'		S-6	24/20	10-12	3-6	ND	S-6: Stiff, gray-yellow brown, Silty CLAY, gray mottled (saprolite).	10'	
					10-13				
								SAPROLITE	
		S-7	24/19	14-16	5-9	ND	Very stiff, gray-yellow orange, Silty CLAY, mottled with laminated fine to medium Sand portings (saprolite).		
15'					13-6				
		S-8	24/18	19-21	9-7	ND	Stiff, gray, Silty CLAY, fine to coarse Sand, little fine Gravel (moderately weathered rock and saprolite).		
20'					7-9				
								23'	
		S-9	24/16	24-26	14-10	ND	Stiff, olive-gray, Silty CLAY, fine to coarse Sand, little fine Gravel.	SAPROLITE AND BEDROCK	5
25'					9-14				
								28'	
		S-10	24/17	29-31	17-19	ND	Very stiff, olive-gray, moderately weathered bedrock (andesite), little Silty Clay.	HIGHLY WEATHERED BEDROCK	

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a 580B organic vapor meter equipped with a photoionization detector (PID) and 10.7 eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv). PID background reading = 0.0 ppm.
2. Water observed at 3 feet, while 6-inch casing at 4 feet.
3. Alluvium-saprolite transition between 8.5 and 10 feet below ground surface. Losing mud at this depth. Pound 6-inch casing to 9 feet.
4. Using 4-inch spin casing with drilling mud after 6-inch drive casing.
5. Drill mud loss between 26 and 29 feet below grade (± 50 gallons).

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-509R

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-509R
Page: 2 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti, D. Adilman
Date Start/Finish: 1-17-02 / 1-25-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

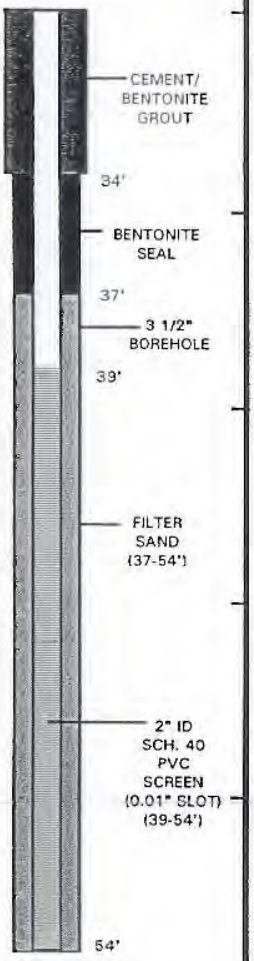
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	6"/4"	2"/2-1/2"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
					20-15	ND	Andesite, little olive-brown, Silty Clay (moderately weathered, rk w saprolite).	HIGHLY WEATHERED BEDROCK	6
									7
									8
		CORE BARREL			MIN/FT	RQD			
35'		C-1	36/18	34-35	7	0	C-1: Hard, slightly weathered to fresh, bluish gray, fine to medium grained Andesite porphyry, highly fractured non-oxide stained joints/fractures.	34'	
				35-36	7				
				36-37	7				
		C-2	24/15	37-38	8	0	C-2: Similar to C-1; trace pyrite/chalcopyrite.		9
				38-39	8				
40'		C-3	60/11	39-40	9	0	C-3: Similar to C-1.		
				40-41	7				
				41-42	8				
				42-43	9			HIGHLY FRACTURED ANDESITE PORPHYRY	
				43-44	9				
45'		C-4	60/11	44-45	11	0	C-4: Similar to C-1, except several strongly iron-oxide stained joints/fractures.		
				45-46	10				
				46-47	9				
				47-48	10				
				48-49	10				
50'		C-5	60/8	49-54	10	0	C-5: Similar to C-1.		
					9				
					9				
					9				
					10				
55'							Bottom of boring at 54 feet.	54'	

Equipment Installed



REMARKS

6. Difficult roller bit advance between 31 and 34 feet; spun casing to 34 feet.
7. Replaced drilling mud with clean water.
8. Used 2 1/2-inch core barrel (HO size).
9. Water loss estimated at 100 gallons between 37 and 39 feet; spun casing to 39 feet.

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GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-510L
Page: 1 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti
Date Start/Finish: 2-6-02 / 2-6-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

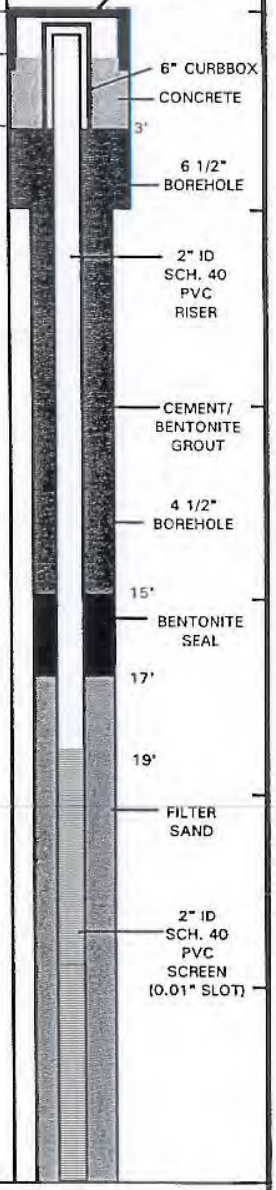
	Auger/ Casing	Sampler
Type:	Flush Joint	NA
O.D. / I.D.:	4"/4-1/2"	
Hammer Wt.:		
Hammer Fall:		
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
							Refer to log GZ-510R for stratum descriptions.		1, 2

Equipment Installed



REMARKS

1. Boring advanced with a 6-inch drive casing to 4 feet and 4-inch spin casing and drilling mud to 16 feet.
2. Clean water used from 16 feet to total depth.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-510L

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-510L
Page: 2 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti
Date Start/Finish: 2-6-02 / 2-6-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

	Auger/ Casing	Sampler
Type:	Flush Joint	NA
O.D. / I.D.:	4"/4-1/2"	
Hammer Wt.:		
Hammer Fall:		
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.	Equipment Installed
35'										FILTER SAND (17-39')
										2" ID SCH. 40 PVC SCREEN (0.01" SLOT) (19-39')
40'							Bottom of boring at 39.5 feet.	39.5'		39.5'
45'										
50'										
55'										

REMARKS

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-510R
Page: 1 of 3
File No.: 20876.5
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti
Date Start/Finish: 1-28-02 / 2-6-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

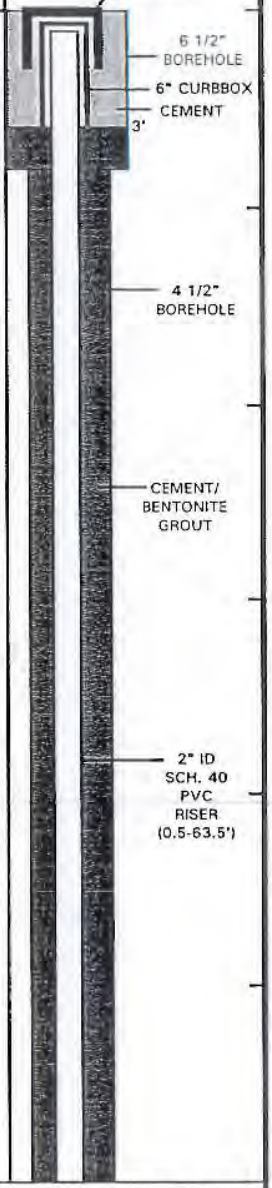
	Auger/ Casing	Sampler
Type:	Flush Joint	SS
O.D. / I.D.:	4"/4-1/2"	2"/2-1/2"
Hammer Wt.:	NA	140#
Hammer Fall:	NA	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Info: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		S-1	24/15	0-2	26-9	0.3	Medium dense, grayish brown, fine to coarse SAND, some Silt. Fill.	ASPHALT 2" FILL 2'	1
					3-3				2
		S-2	24/17	2-4	6-8	0.1	Stiff, yellow-brown, SILT and CLAY, little fine to coarse Sand.		
					8-13				
5'		S-3	24/20	4-6	5-9	0.1	Very stiff, yellow-brown gray, SILT and CLAY, trace fine Sand.		
					14-15				
		S-4	24/21	6-8	11-17	ND	Very stiff, yellow-brown gray, SILT and CLAY, trace brecciated gray Rock, fine Sand.		
					19-21				
10'									
								THOR-OUGHLY WEATHERED BEDROCK (SAPROLITE)	3
15'		S-5	24/2	14-16	43-18	ND	Hard, olive brown, Silty CLAY, some Gravel pieces (saprolite).		4
					17-20				
20'		S-6	12/6	19-20	102-	ND	Hard, olive brown, Silty CLAY, little fine to coarse Sand and Gravel pieces (saprolite).		
					112				
25'		S-7	24/22	24-26	16-31	ND	Hard, olive brown-orange, Silty CLAY, little fine to coarse Sand and fine Gravel pieces (saprolite).		
					57-55				
		S-8	12/12	29-30	55-125	ND	Hard, olive brown-orange, Silty CLAY, little fine to coarse Sand and fine Gravel pieces.		

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a 580B organic vapor meter equipped with a photoionization detector (PID) and 10.7 eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv). PID background reading = 0.0 ppm.
2. Drill mud mixed to 12 pound per gallons; drill mud used during drive and wash method of borehole advance between 4 and 55 feet below existing grade (beg).
3. Vigorous rapping of drill rod; increase down pressure required to drill between 13 and 14 feet.
4. Piece of gravel wedged in bottom of split spoon at sample S-5.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-510R

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-510R
Page: 2 of 3
File No.: 20876.5
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti
Date Start/Finish: 1-28-02 / 2-6-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

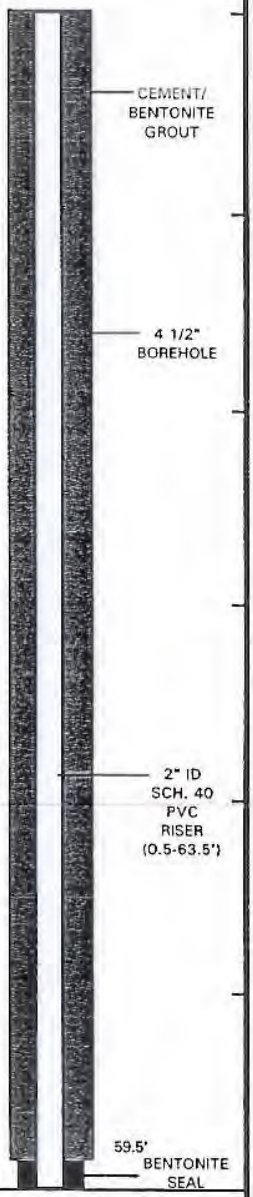
	Auger/ Casing	Sampler
Type:	Flush Joint	SS
O.D. / I.D.:	4"/4-1/2"	2"/2-1/2"
Hammer Wt.:	NA	140#
Hammer Fall:	NA	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
								HIGHLY WEATHERED BEDROCK	6
								33'	
35'		S-9	12/7	34-35	58-106	ND	Hard, olive brown, Silty CLAY and moderately weathered Andesite bedrock (fine to medium gravel pieces).		
									7
40'		S-10	12/8	39-40	55-73	ND	Hard, olive-orange brown, Silty CLAY, little fine to coarse Sand, fine Gravel pieces Andesite.		
								MODERATELY WEATHERED BEDROCK AND SAPROLITE	
45'		S-11	12/9	44-45	48-86	ND	Hard, olive-orange brown, Silty CLAY, fine to coarse Sand, Gravel pieces Andesite.		
50'		S-12	12/10	49-50	89-100	ND	Hard, olive-orange brown-gray, Silty CLAY, some fine Sand, fine Gravel pieces Andesite.		
55'		S-13	18/10	54-55.5	52-72	ND	Hard, olive-orange brown-gray, Silty CLAY, fine to coarse Sand, fine Gravel pieces.		
					104				
								57' HIGHLY FRACTURED ANDESITE BEDROCK	5
		CORE BARREL			MIN/FT	RQD			
		C-1	60/30	59-64	10	28	Hard, to very hard, fresh to slightly weathered, fine grained, gray, ANDESITE, highly		6

Equipment Installed



REMARKS

5. Vigorous rapping of drill rod and roller bit at 57 to 59 feet; rock chips observed in return water.
6. Rock coring with HQ core bit between 59 and 79 feet.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-510R
Page: 3 of 3
File No.: 20876.5
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: M. Ponti
Date Start/Finish: 1-28-02 / 2-6-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

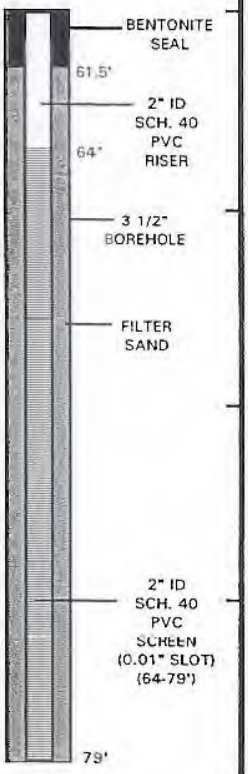
	Auger/ Casing	Sampler
Type:	Flush Joint	SS
O.D. / I.D.:	4"/4-1/2"	2"/2-1/2"
Hammer Wt.:	NA	140#
Hammer Fall:	NA	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Info: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
					9		fractured, shallow to steeply dipping, rough to smooth, very closely spaced, slightly weathered to filled joints/fractures.		
					9				
					8				
					9	RQD =			
65'		C-2	60/36	64-69	10	27	Similar to S-1, except bottom 14" exhibits pitted texture with fine Calcite filled lugs.		
					10				
					9				
					10			HIGHLY FRACTURED ANDESITE BEDROCK	
					10	RQD =			
70'		C-3	60/60	69-74	11	58	Hard to very hard, fresh, fine grained, gray, ANDESITE, moderately to highly fractured, very close to closely spaced, rough to smooth, shallow to steeply dipping, slightly weathered to filled (calcite) joints/fractures.		
					10				
					11				
					10				
					9	RQD =			
75'		C-4	60/21	74-79	9	18	Similar to C-3, except highly fractured with trace, dissemenated pyrite/chalcopyrite.		
					8				
					9				
					9				
					8				
							Bottom of boring at 79 feet.	79'	
80'									
85'									

Equipment Installed



REMARKS

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-512L
Page: 1 of 1
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: D. Adilman
Date Start/Finish: 1-16-02 / 1-16-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

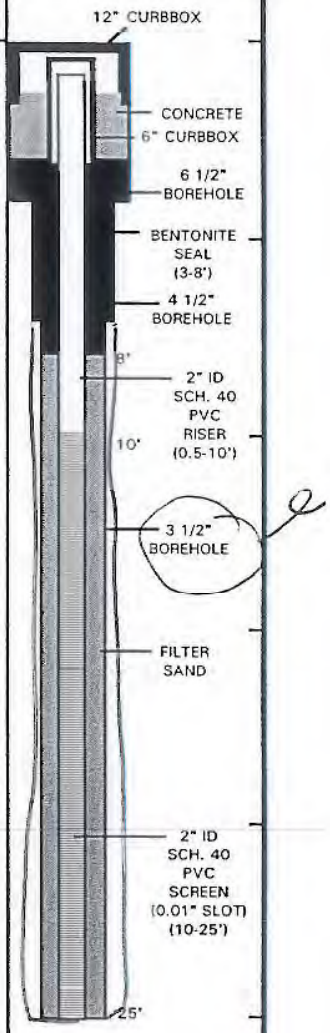
	Auger/ Casing	Sampler
Type:	Flush Joint	N/A
O.D. / I.D.:	6"/6.5-	
Hammer Wt.:	4"/4.5	
Hammer Fall:		
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
							No sampling performed. Refer to log GZ-512R for stratum descriptions.		
25'							Bottom of boring at 25 feet.	25'	

Equipment Installed



REMARKS

1. Screen location based on results from GZ-512R.
2. Boring advanced with a 6-inch drive casing and drilling mud to 4 feet, and 4-inch spin casing and drilling mud to 7 feet.
3. Clean water and 4-inch spin casing used from 7 feet to total depth.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-512L

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-512R
Page: 1 of 3
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: D. Adilman, M. Ponti
Date Start/Finish: 1-9-02 / 1-15-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

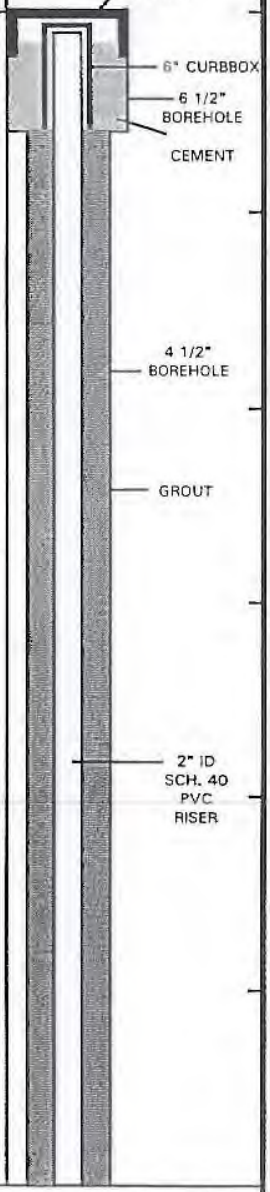
	Auger/ Casing	Sampler
Type:	Flush Joint	SS
O.D. / I.D.:	6"/6.5-	2"/2-1/2"
Hammer Wt.:	4"/4.5	140#
Hammer Fall:		30"
Other:	Ho Core Barrel	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
1-16-02	0730	15.8	out	12 hrs

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		S-1	18/14	0.5-2.0	8	ND	S-1: Top 3": Asphalt, 3" cement with wire. Medium dense, orange-brown black, fine to medium SAND, little Silt, trace coarse Sand (till).	FILL 1.5'	
					9-10				1
		S-2	24/17	2-4	12-12	ND	S-2: Very stiff, yellow-brown, CLAY & SILT, trace fine Sand.	ALLUVIUM	2
					13-10				
5'		S-3	24/18	4-6	7-7	ND	Top 10": Stiff, yellow-brown gray, CLAY and SILT. Bottom 8": Yellow-brown gray, Silty CLAY, little fine to medium Sand.	4'	
					9-11				
10'		S-4	24/7	9-11	6-9	ND	Stiff, yellow-brown gray, Silty CLAY, little fine to medium Sand. Bottom 2": Hard, dark gray-black green, Breccia Rock. Dry.		3
					7-6				4
15'		S-5	24/24	14-16	4-7	ND	Stiff, yellow-brown gray-white, Clayey SILT, trace fine Sand, some laminations. Dry.	THOR-OUGHLY WEATHERED ROCK (SAPROLITE)	5
					9-16				
20'		S-6	24/18	19-21	10-14	ND	Top 10": Stiff, yellow-brown gray-white, Clayey SILT, trace fine Sand. Bottom 8": Very stiff, gray-white, thoroughly weathered Rock (friable silt-like) with jointing, iron staining on some joints.	20'	
					14-41				
25'		S-7	14/14	24-25.2	22-68	ND	Very stiff, gray-white, thoroughly weathered Rock (friable silt-like) with jointing (some fe staining). 1" zone of yellow-brown color. Dry.	FRIABLE HIGHLY FRACTURED WEATHERED ROCK	
					50/2"				
		S-8	7/7	29-29.6	70-50/1"	ND			

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a 580B organic vapor meter equipped with a photoionization detector (PID) and 10.7 eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv). PID background reading = 0.5 ppm.
2. Four feet mixed mud, super gel to 50 seconds, then barite to 12 pounds/gallon, approximately 1 3/4 bags of barite = 45 gallons.
3. Leave 6-inch casing at 4 feet. Installed 4-inch casing to 9 feet. Clean with roller bit and mud, sample from 9 to 11 feet.
4. At 11 feet, mud thinned from 12 pounds/gallon to 9 pounds/gallon. Possible water at 11 to 12 feet.
5. Mud at 12 pounds/gallon; ND with OVM.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-512R
Page: 2 of 3
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: D. Adilman, M. Ponti
Date Start/Finish: 1-9-02 / 1-15-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

	Auger/ Casing	Sampler
Type:	Flush Joint	SS
O.D. / I.D.:	6"/6.5-	2"/2-1/2"
Hammer Wt.:	4"/4.5	140#
Hammer Fall:		30"
Other:	Ho Core Barrel	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
1-16-02	0730	15.8	out	12 hrs

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
35'		S-9	5/5	34-34.5	100/5"	ND	Very dense, dark gray-rust, fine to medium SAND (very weathered friable rock) some jointing.	FRIABLE WEATHERED ROCK	6
40'		S-10	9/9	39-39.8	43-	ND	Very dense, gray-green rust-black, SILT and fine to medium Sand (weathered friable rock), clear remnant rock jointing, rust on joint planes. Moist.		7 8 9
					100/5"				
45'		S-11	17/15	44-45.4	32-57	ND	Top 5": Completely fractured black rock (Andesite), coarse Gravel-size pieces. Next 10": Olive-gray rust, SILT, fine Sand and rock fragments with iron staining. Dry.		10
					105/5"				
		CORE BARREL			MIN/FT				
50'		C-1	66/35	49-54.5	9.5		RQD = 8/35 = 23%. Hard, fresh to slightly weathered, dark gray to black, fine grained Andesite, highly fractured with steep to horizontal filled joints, trace pyrite.	49'	11 12
					16.0				
					14.5				
					13.5				
					10.0			HIGHLY FRACTURED ANDESITE ROCK	
55'		C-2	60/30	54.5-60	12.0		RQD = 0 Hard, fresh to slightly weathered, dark gray-black, fine grained Andesite, highly fractured, trace pyrite.		
					9.0				
					9.0				
					10.0				
					11.0				

Equipment Installed

REMARKS

6. Rock is so fraible and decomposed, cannot core, continue with mud casing.
7. Spinning casing to 39 feet, very slow, but penetrating.
8. Casing at 39 feet, swith to water (samples approaching fresher rock, remove mud from borehole and tub).
9. Coarse sand size black fragments in wash water (some rusty silt/sand).
10. More silty, rusty remnant rock, continue with casing and spoons.
11. Casing at 49 feet, hard and not penetrating, spinning at 49 feet; lots of cuttings; losing water (50 gallons), try core barrel.
12. Core barrel is HO (2.5" ID) size.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
San German, Puerto Rico

Boring No.: GZ-512R
Page: 3 of 3
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: F. Rivera
Logged by: D. Adilman, M. Ponti
Date Start/Finish: 1-9-02 / 1-15-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

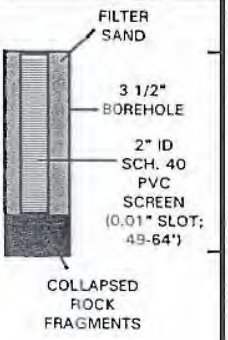
	Auger/ Casing	Sampler
Type:	Flush Joint	SS
O.D. / I.D.:	6"/6.5-	2"/2-1/2"
Hammer Wt.:	4"/4.5	140#
Hammer Fall:		30"
Other:	Ho Core Barrel	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
1-16-02	0730	15.8	out	12 hrs

Depth	Casing Blows	Sample Info: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		C-3	60/32	60-65.5	11.0		RQD = 13/32 = 41% Hard, fresh to slightly weathered, dark gray, fine grained Andesite, highly fractured with moderately to vertical dripping, very thin calc-silicate filled to slightly weathered joints.		12
					11.0				
					11.0				
					12.0				
					10.0				
65'							Bottom of boring at 65 feet.	65'	
70'									
75'									
80'									
85'									

Equipment Installed



REMARKS

13. C-3 core, barrel jumping while coring. Difficult pulling out. To avoid losing borehole, stopped coring, used roller bit to clean, install well.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-513L
Page: 1 of 1
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-30-02 / 1-30-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

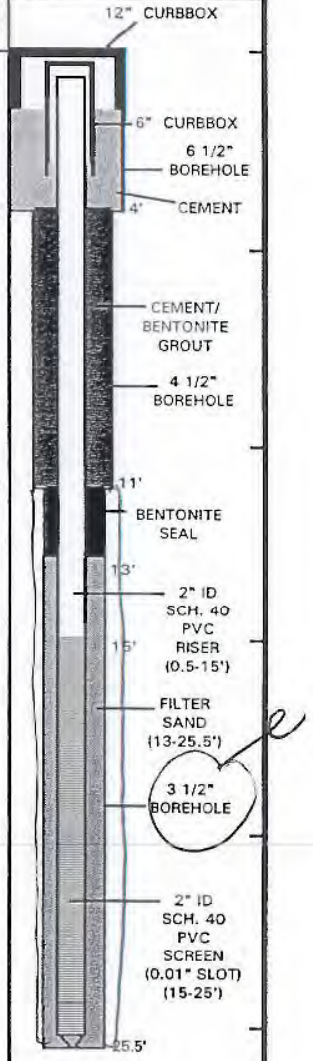
	Auger/ Casing	Sampler
Type:	Casing	N/A
O.D. / I.D.:	6"/4"	
Hammer Wt.:	300#	
Hammer Fall:	30"	
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
01-22-02	0945	20.97	out	

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
							No sampling performed. Refer to boring log GZ-513R for stratum descriptions.		
25'							Bottom of boring at 25.5 feet.	25.5'	

Equipment Installed



REMARKS

1. Screen location determined from sample descriptions at GZ-513R.
2. Used 6-inch drive casing to 4 feet, and 4-inch spin casing with drilling mud to 11 feet.
3. Clean water and 4-inch spin casing used from 11 feet to total depth.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-513R
Page: 1 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-23-02 / 1-30-02
Boring Location: See Exploration Location Plan
GS Elev.: NA Datum: NGVD

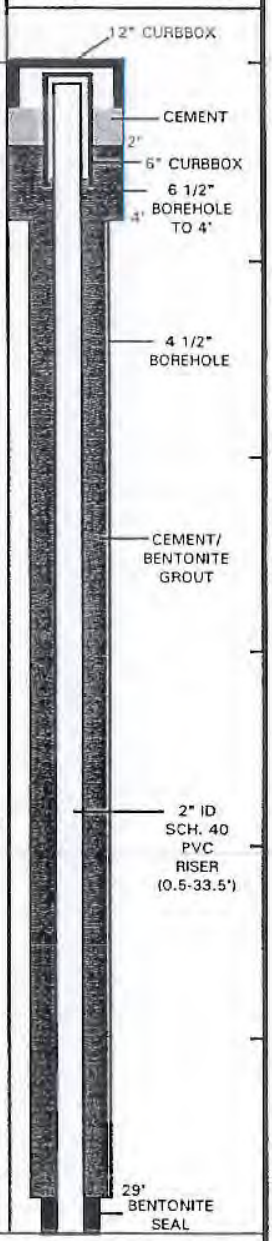
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	4"/4-1/2"	2"/2-1/2"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
02-02-02	0910	16.51	out	

Depth	Casing Blows	Sample Information: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		S-1	24/22	0-2	65-32	4.4	S-1: Top 4": Hard, compact, black, asphalt. Bottom 12": Dense, compact, yellowish brown to olive-gray, gravelly SAND. Dry.	ASPHALT 4" FILL	1
					18-19				
		S-2	24/24	2-4	15-16	1.3	Bottom 4": Soft to medium, yellowish brown to olive-gray, CLAY, trace Sand.	1.5'	2
					14-8		S-2: Dense, compact, olive/yellowish brown, GRAVEL, (subangular clasts), some Clay, trace to little Sand. Dry. Bottom 2": Soft CLAY. Moist.	ALLUVIUM	3
5'		S-3	24/24	4-6	2-2	1.0			
					4-5		S-3: Soft to medium, very dark gray, CLAY, trace Silt and Sand, moderately organic. Slightly moist.		
		S-4	24/24	6-8	2-4	1.3	S-4: Top 8": Same as above. Bottom 16": Medium to stiff, olive to yellowish brown to dark gray, CLAY, little coarse Sand and fine Gravel. Slightly moist.	SAND & GRAVEL	
					5-7			ALLUVIUM	
		S-5	24/24	8-10	2-4	0.3	S-5: Stiff, yellowish brown to light olive, CLAY, trace Silt and fine to medium Sand. Slightly moist.		4
10'					4-6			11.8'	5
		S-6	24/14	10-12	3-6	0.1	S-6: Same as above. Traces of hard rock fragments. Slightly moist. Bottom 2": Very stiff, yellowish brown-olive, CLAY, trace rock fragments.		
					7-9				
		S-7	24/24	12-14	5-11	0.0	S-7: Very stiff, yellowish brown-olive, CLAY, some thoroughly weathered, gravel-sized volcanic rock fragments, little Silt. Slightly moist.	SAPROLITE	
					21-39				
15'									
20'		S-8	24/18	19-21	19-18	0.3	Top 4": Soft to medium, brownish yellow-gray, CLAY. Bottom 14": Hard, severely fractured, highly weathered volcanic rock fragments, trace Clay.	19'	6
					24-21				
25'		S-9	2/0	24-26	50/2"	0.1	No recovery.	FRIABLE HIGHLY WEATHERED ROCK	
		S-10	5/4	29-29.5	50/5"	0.0	Loose, hard, dark gray to olive, andesite fragments, little Clay.		7
	CORE BARREL	C-1	60/0	29-34	ROD =	0.0	No recovery .		

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a 580B organic vapor meter equipped with a photoionization detector (PID) and 10.7 eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Started sampling at 0905. PID background reading at 0.0 ppm.
3. Started preparing drill mud at 0945. Finished at 1050.
4. Collected sample of drill mud and screened for VOCs with PID. Reading was 0.3 ppm.
5. At 1530, spoke with Eng. Ortiz-Feliciano of PREPA and coordinated parking space for drilling at 510R next day.
6. Started loosing drill mud at 20 feet. Stopped drilling to prepare additional mud.
7. Very hard at 28 feet for spin casing to advance. Flushed mud out of borehole and tub, replaced with clean water to start coring.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: GZ-513R

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Former Compaq Facility Phase IV
PREPA Off-Site Wells

Boring No.: GZ-513R
Page: 2 of 2
File No.: 20876.55
Check: DJA

Contractor: Geocim, Inc.
Foreman: J. Calderon
Logged by: J. Feliciano
Date Start/Finish: 1-23-02 / 1-30-02
Boring Location: See Exploration Location Plan
GS Elev.: NA **Datum:** NGVD

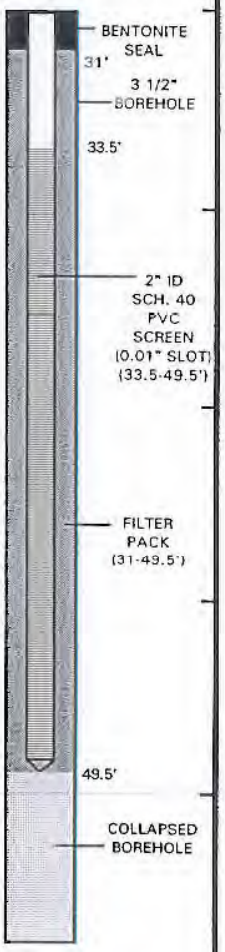
	Auger/ Casing	Sampler
Type:	Casing	SS
O.D. / I.D.:	4"/4-1/2"	2"/2-1/2"
Hammer Wt.:	300#	140#
Hammer Fall:	30"	30"
Other:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
02-02-02	0910	16.51	out	

Depth	Casing Blows	Sample Info: No.	Pen/ Rec. (In.)	Depth (Ft.)	Blows (/6")	Field Test Data (ppm)	Sample Description & Classification	Stratum Desc.	Rmks.
		CORE BARREL							
35'		C-2	24/12	34-36	RQD =		Highly weathered to fresh, severely fractured, bluish gray/olive, Andesite, hydrothermally altered surfaces.	HIGHLY FRACTURED	
					0.0				8
		C-3	12/8	36-37	RQD =		Same as Run 2.		9
					0.0				
		C-4	60/30	37-42	RQD =		Same as Run 2, highly weathered to fresh, highly fractured, oxidized fissures.		
40'					1.0				
		C-5	60/0	42-47	RQD =		No recovery.	ANDESITE ROCK	
					0.0				
45'									
		C-6	60/24	47-52	RQD =		Hard, slightly weathered to fresh, highly to severely fractured, bluish gray to light olive, Andesite, hydrothermally altered, oxidized joint surfaces.		10
					0.0				
50'									
		C-7	24/12	52-54	RQD =		Same as Run 6.		
					0.0				11
55'							Bottom of boring at 54 feet.	54'	12

Equipment Installed



REMARKS

8. Refusal of core bit to spin; got stuck at bottom due to fractured fragments.
9. Problem above repeated.
10. Started at 47 feet on 1-24-02.
11. Reaming borehole with tri-cone bit and water. Material collapsing into borehole. Decided to install well at 49.5 feet.
12. Finished grouting with tremie at 1030 on 1-30-02.

Attachment 2 - Photographic Log

Photographic Log

Client Name: HP, Inc.	**Site Location:** PR-362, San German, PR	**Project No.** 01.0024065.20

Photo No.	**Date:**
1	3/7/2016

Direction Photo Taken:
N/A

Description:
Corroded transducer connection from well GZ-507R.

Photo No.	**Date:**
2	3/7/2016

Direction Photo Taken:
N/A

Description:
Corrosion visible inside the connections for the transducer at well GZ-507R.

Photographic Log

Client Name: HP, Inc.	**Site Location:** PR-362, San German, PR	**Project No.** 01.0024065.20

Photo No.	**Date:**
3	3/7/2016

Direction Photo Taken:
N/A

Description:
Corroded transducer connection from well GZ-507R.

Photo No.	**Date:**
4	

Direction Photo Taken:

Description:
Corrosion visible inside the connections for the transducer at well GZ-508R.

Attachment 3 - Analytical Data Summary Table

ATTACHMENT 3
Summary of Groundwater Testing Results (*u* g/L)
PREPA Off-Site Monitoring Wells
Hewlett-Packard Voluntary Remediation Project
San German, Puerto Rico

SAMPLE LOCATION & DATE		Chloroform	1,1- Dichloroethane (DCA)	1,2-Dichloroethane	1,1-Dichloroethene	Trichloroethene (TCE)	Vinyl chloride	cis-1,2 Dichloroethene (DCE)	trans-1,2 Dichloroethylene
GZ-507L	**Jun-02**	**2.5**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	**1.0**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	**0.26J**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-507R	**Mar-02**	<1.0	<1.0	<1.0	<1.0	**15**	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	**1.3**	**33**	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	**25**	<1.0	**0.11J**	<1.0
	Dec-02	**0.17J**	<1.0	<1.0	**0.24J**	**54**	<1.0	**1.1**	<1.0
GZ-508L	**Mar-02**	**20**	<1.0	<1.0	<1.0	15	<1.0	<1.0	<1.0
	Jun-02	**4.2**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-508R	**Mar-02**	<1.0	<1.0	<1.0	<1.0	**14**	<1.0	**1.1**	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	**16**	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	**9.7**	<1.0	**0.83J**	<1.0
	Dec-02	<1.0	<1.0	<1.0	<1.0	**13**	<1.0	**1.8**	<1.0
GZ-509U	**Dec-02**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**	<1.0
GZ-509L	**Mar-02**	**1.1**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	**0.14J**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-509R	**Mar-02**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-510L	**Mar-02**	**1.6**	<1.0	<1.0	**0.018J**	**59**	<1.0	**8.8**	<1.0
	Jun-02	**1.7**	<1.0	<1.0	<1.0	**60**	<1.0	**8.0**	<1.0
	Sep-02	<2.5	<2.5	<2.5	<2.5	**43**	<2.5	**5.4**	<2.5
	Dec-02	**0.85J**	**0.97J**	<1.0	**0.49J**	**60**	**0.5J**	**11**	**0.24J**
GZ-510R	**Mar-02**	<1.0	<1.0	**0.087J**	<1.0	**1.3**	**0.14J**	**16**	**0.015J**
	Jun-02	<5.0	<5.0	<5.0	<5.0	**110**	<5.0	**9.2**	<5.0
	Sep-02	<1.0	**0.16J**	<1.0	<1.0	**14**	**0.23J**	**16**	<1.0
	Dec-02	<1.0	**0.46J**	<1.0	<1.0	**22**	<1.0	**24**	<1.0
GZ-512L	**Mar-02**	**10**	<1.0	**0.022J**	<1.0	**0.062J**	<1.0	<1.0	<1.0
	Jun-02	**1.9**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	**0.26J**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-512R	**Mar-02**	**1.4**	**0.26J**	<1.0	**0.74J**	**42**	**0.95J**	**7.4**	**0.017J**
	Jun-02	<1.0	<1.0	<1.0	**2.8**	**40**	<1.0	**4.9**	<1.0
	Sep-02	<1.0	**0.96J**	<1.0	**3.3**	**15**	**0.76J**	**16**	<1.0
	Dec-02	<1.0	**2.1**	<1.0	**8.6**	**14**	**0.7J**	**9.4**	<1.0
GZ-513L	**Mar-02**	**6.1**	<1.0	<1.0	<1.0	<1.0	**0.024J**	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GZ-513R	**Mar-02**	**3.1**	<1.0	<1.0	<1.0	**0.023J**	<1.0	<1.0	<1.0
	Jun-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Sep-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Dec-02	<1.0	<1.0	<1.0	<1.0	**0.38J**	<1.0	<1.0	<1.0

Notes:
1. All units are micrograms per liter (ug/L).
2. "J" indicates the concentration reported was at or below the reporting limit.
3. "< " indicates the compound was not detected above the method quantification limit shown.
4. **Boldface** values reflect detected analytes.